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EXAMINER

CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 05/03/2006

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/080,754
Filing Date: February 22, 2002
Appellant(s): FLY ET AL.

MAILED
MAY 03 2006
GROUP 1700

David A. McClaughry
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 12, 2006 appealing from the Office action mailed July 11, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,258,476

CIPOLLINI

7-2001

(9) Grounds of Rejection

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The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

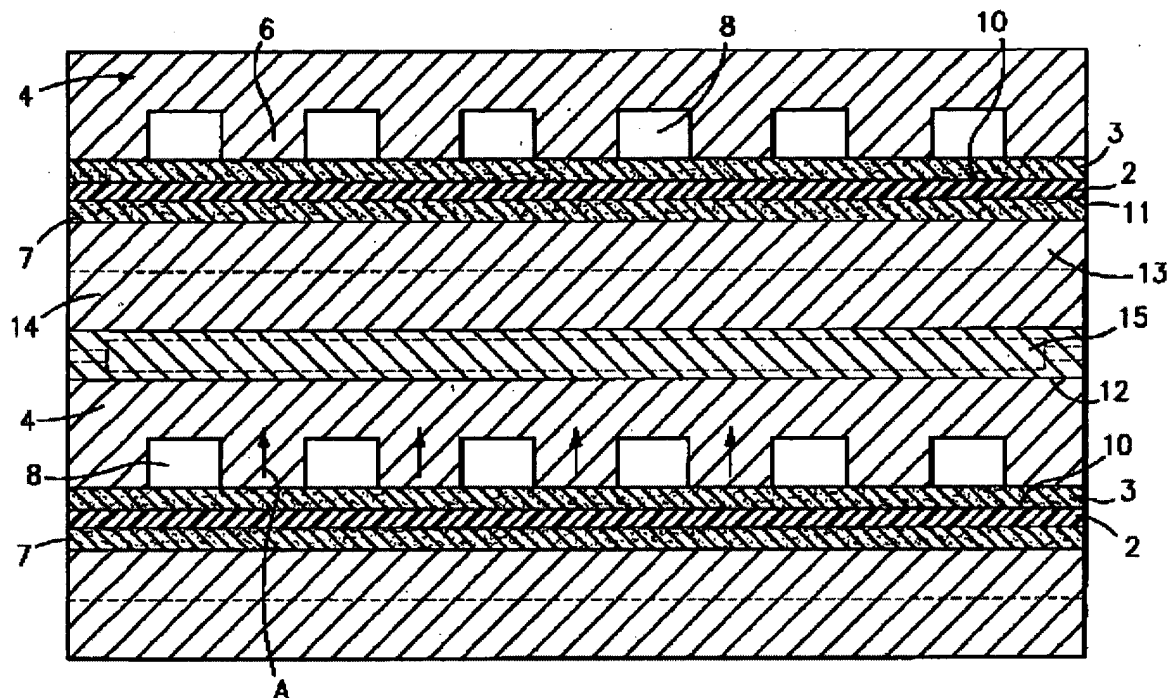
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the Appellant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the Appellant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 13, 15 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,258,476 (Cipollini).

Cipollini discloses a solid polymer membrane fuel cell which includes a membrane electrode assembly having a membrane (2), with a first catalytic layer (3) on a first face of the membrane, and a second catalytic layer (7) on a second face of the membrane. Bipolar plate assembly (13, 14) is adjacent the anode catalytic layer (7) and is in electrical contact with the catalytic layer. The surface of the anode gas flow field plate (13) contacts a gas impermeable member (14). See Cipollini, column 5, lines 31-34.) Thus, layer 14 is nonporous and gas impermeable. The bipolar plates, reference 4 and references 13 and 14 include gas distribution layers having a plurality of highly porous reactant gas flow channels (8) or (13) which extend transversely through the as distribution layers, in generally parallel orientations. (See Fig. 2.) Clearly, the porous reactant gas flow channels (8) are in fluid communication with catalytic layer (3). FIG. 2

**FIG. 2**

The presence of water in "transfer member" or bipolar plate assembly (4) prevents cathode reactant gas from migrating from the gas passages through the transfer member. (See Cipollini, column 5, lines 51-54.) Thus, the upper layer of plate 4 is impermeable to cathode reactant gas.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Appellant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2, 4, 9, 10, 14, 16, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cipollini.

With regards to claims 2, 4, and 9, Cipollini discloses Appellants' invention essentially as claimed, with the exception that specifics of porosities, gas permeability, and electrical resistance are not disclosed. However, it is clear to one of ordinary skill in the art that porosity will effect gas permeability, which will effect gas flow, which will effect output voltage of a fuel cell. Thus, it would have been obvious to one of ordinary

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skill in the art to adjust porosity and permeability in order to achieve the desired operating properties of a fuel cell.

With regards to claim 10, Cipollini discloses Appellants' invention essentially as claimed, with the exception that the electrical resistance of flow channels is not specifically described by Cipollini. However, it would have been obvious to one of ordinary skill in the art to reduce the electrical resistance as much as possible in order to reduce the internal resistance of the fuel cell. In the absence of a showing of unexpected results or criticality of the value of 50 mΩ-cm, electrical resistance is considered to be a result-effective variable which would have been within the skill of the ordinary artisan to adjust.

With regards to claims 14 and 16, Cipollini discloses Appellants invention essentially as claimed, with the exception that Cipollini does not specifically disclose particular metallic foams or types of carbon foam to be used. However, without a showing of unexpected results resulting from the material recited by the Appellants, one of ordinary skill in the art would consider the Cipollini generic disclosures of carbon particles and metallic sponge to encompass the materials recited by the Appellants.

With regards to claim 18, Cipollini discloses Appellants' invention essentially as claimed, with the exception that Cipollini does not specifically disclose a plurality of coolant flow channels. The Cipollini disclosure does not recite a specific number of coolant flow channels in the invention, although there is clearly at least one channel. duplicate channels would provide additional cooling. The duplication of parts (for a multiplied effect) has been shown to be obvious unless a synergistic effect can be

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shown. See *St. Regis Paper Co. v. Bemis Co., Inc.*, 193 USPQ 8, 11, (7th Cir.) 1977.

Therefore, it would have been obvious to one of ordinary skill in the art to provide a plurality of coolant flow channels in the Cipollini invention in order to provide additional cooling.

Allowable Subject Matter

Claims 6-8, 11, 12 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. With regards to claim 8, the prior art does not suggest a fuel cell with a convoluted membrane electrode assembly and a convoluted surface of a gas distribution layer. With regards to claims 11 and 12, the prior art fails to suggest a fuel cell comprising a porous conductive interface layer between a gas distribution layer and a catalytic layer. With regards to claims 20, 21, 6 and 7, the prior art does not disclose or suggest the fuel cell structure as claimed, wherein leg portions and barrier portions are formed within the porous reactant gas flow channels.

Claims 22-25 are allowed.

(10) Response to Argument

Issue A-1 - Appellant argues that Cipollini does not teach of first and second "non-porous impermeable conductive separator plate[s]".

The Examiner respectfully disagrees.

As shown in the record, the previous examiner of record established that

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transfer plate 4 is impermeable to reactant gas, (see column 5, lines 51-54) and although the plate is initially a "fine pore plate", when the plate is placed in contact with water, any void volume in the plate is filled, so the plate becomes non-porous in operation.

Upon consideration of this argument in light of the scope of the claim, the present Examiner of record agrees with the prior examiner in that the claims fail to provide sufficient limitations to the claims to differentiate the claimed bipolar plate from that of Cipollini since the claim does not define how the claimed bipolar plate is different with respect to its impermeability and non-porous structure.

It is maintained that the plate of Cipollini will be both non-porous in structure upon filling of water within the voids of the plate and with the presence of water within the plates, further be impermeable with respect to reactants flow on opposing sides of the plate thus preventing reactant crossover.

In simplest terms, the claim broadly recites that the separators are non-porous, impermeable, conductive plates.

However the extent or specific degree to which the separator is non-porous and impermeable is not defined by the claim and open to an interpretation which is broader than what Appellant argues. Even though the separator plate of Cipollini is, by itself, selectively porous (e.g. the nature of the pores limits what materials and penetrate the pores in the plate) it is apparent that the pores of Cipollini, when filled with water, results in a plate which is non-porous to materials other than water, and subsequently impermeable to the reactant gases provided to the fuel cell. The resultant separator

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plate, during operation of the fuel cell, is therefore rendered into a non-porous state with respect materials other than water and thus impermeable to the fuel cell reactants (fuel at the anode and oxidant at the cathode).

Therefore to the extent that the claim fails to define how the separator plate is non-porous and impermeable, it is maintained that when water is provided in the plate of Cipollini, the separator plate is non-porous to materials other than water and impermeable to the reactants of the fuel cell. As such, Cipollini still anticipates the claimed separator plate of the instant claims.

Issue A-2 - Appellant now additionally argues that Cipollini fails to disclose both a second bipolar plate assembly and a second separator plate. Specifically, The Examiner considers product water transfer member (4) of Cipollini to be both the second separator plate and second plate assembly required by claim 1. As such, Appellants submit that Cipollini fails to disclose the bipolar plate and the second separator plate of claim 1.

The Examiner respectfully disagrees.

Each plate is made of two portions, a first gas distribution portion 13 and a second gas impermeable member 14. The configuration for this anode plate is identical in configuration to that of the cathode plate (see col. 5, ll. 25-35). Thus contrary to Appellants position Cipollini does in fact teach of a gas diffusion portion 13 and gas impermeable member 14 attached to the backside portion of the gas distribution portion 13 for each bipolar plate.

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Issue B - Appellant fails to provide any additional arguments in Issue B apart from those arguments presented in Issue A above, incorporated herein.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

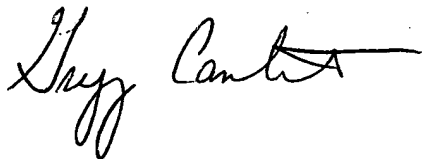
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Gregg Cantelmo

Primary Examiner

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Conferees:

Patrick J. Ryan

Supervisory Patent Examiner

Art Unit 1745



Steven P. Griffin

Supervisory Patent Examiner

Art Unit 1731

